

**MATH 464 (PROBABILITY)
HOMEWORK 3**

FALL 2017

Due on: Thursday 09-14-2017.

Events and Probabilities:

- (1) If 5% of men and 0.25% of women are color blind, what is the probability that a randomly selected person is color blind?
- (2) Statistics show that 3% of men smoke but only 1% of women do. During a non-smoking flight, one passenger is smoking in the restroom. There are 40 male and 60 female passengers on the plane. What is the chance that the person smoking in the restroom is a man?
- (3) On a multiple-choice exam with four choices for each question, a student either knows the answer to a question or marks it at random. Suppose the student knows answers to 60% of the exam questions. If she marks the answer to question 1 correctly, what is the probability that she knows the answer to that question?
- (4) Suppose that the number of children in a family is 1, 2, or 3, with probability $1/3$ each, and boys and girls appear equally likely. Little Bobby has no brothers. What is the probability that he is an only child?
- (5) Suppose A_1, A_2, \dots, A_n are independent. Show that

$$\mathbb{P}(A_1 \cup A_2 \cup \dots \cup A_n) = 1 - \prod_{j=1}^n (1 - \mathbb{P}(A_j))$$